Solar-Infra Systems International Ltd
209-19138 26th Avenue, Surrey, BC, V3S 3V7
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www.solarinfrasystems.com

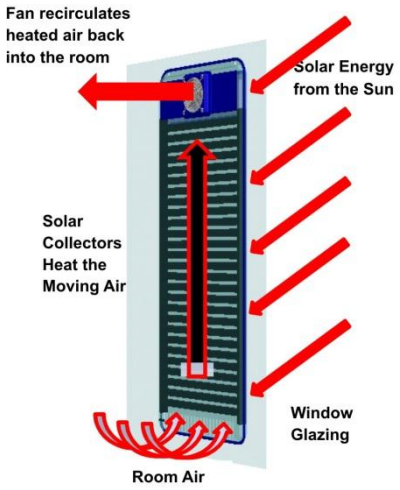
OPERATING INSTRUCTIONS SOLAR THERMAL AIR HEATER Consumer Model SIS C25M 1848

Issue 1/6/2013e

What is an Air Solar Heater

This SIS air solar heater uses the sun's solar energy to heat air through a window in the home, apartment, cottage, boat, RV, and circulate this heated air in the room. This is not a solar PV panel or solar water heater.

The heater is hung or placed in a south facing closed window inside the room or space to be heated.


Fan recirculates heated air back into the room
Solar Energy from the Sun
Solar Collectors Heat the Moving Air
Window Glazing
Room Air

This SIS model air solar heater heats air. It is like an electric room convection air space heater except it is operated by the sun's solar energy. Hang or set it in a sun facing window, or side-ways, or even upside down, and it will maintain heat in a large room or area in the home. The heating capacity is equivalent to a 150 to 500 watt electric heater, depending on the daytime sun and cloud cover.

The model air solar heater is also transparent and will still let most of the window sunlight into the room.

Sunlight and a PV panel also operate a fan on the heater. The fan draws the room air into the heater and then pulls the air through metal solar energy collectors heated by the sun. The solar heated air is recirculated back into the room. The fan has a speed control so the air exchange in the room can be set, usually to 1 to 1-1/2 hours, at up to 75 cubic feet per minute.

Also the perfect answer to heating sheds, garages, cottages, and stored boats and RV's where there is limited or no electricity.

Patented technology and international patents pending.

IMPORTANT

This SIS solar air heater is designed for interior installation behind a single pane window for best efficiency. Double pane, low-E, argon, and triple pane will reduce this efficiency to less than 40% to 65%. .

The SIS Solar Air Heater, mounted inside the room, behind the window glass, reverses this heat loss, collects the solar heat coming through the glass, and heats the air in the room. Ordinary single glazing works best with an interior Air Solar Heater.

SIS has a range of exterior mount models that are not affected by glass obstruction and are capable of heating an entire house. For more information call 1 855 535 2056 or email us at info@solarinfrasystems.com

Don't forget to fill out the Warranty Card and the Solar Energy Payback Estimator

Window Construction		Radiative Heat Loss (Btu/hr/ft2)	Conductive Heat Loss (Btu/hr/ft2)	Total Heat Loss (Btu/hr/ft2)	Compared to Single Pane Heat Loss Reduction	Indoor Glass Temp(°F)
Single Pane	Clear	35	21	56	----	26
Double-Pane	Clear	21	13	34	39%	44
Double-Pane	Low-E	5	15	20	41%	54
Double-Pane	Low-E Argon	2	16	18	47%	56
Triple-Pane	Low-E	2	11	13	62%	59
Triple-Pane	Low-E Argon	1	11	12	65%	60

The SIS Air Solar Heater Installation

1. Hang, or set on the sill, in a south facing window. The window should be ordinary single glazing. **Turn the speed control knob to maximum.**
2. Large glass areas, such as solariums, can have too much heat loss through the glass to the air outside, for this size of SIS air solar heater. It may require more than one heater or a larger model. Please contact us at info@solarinfrasystems.com and we will help you size the solar heating.
3. The Solar Heater can be mounted between the window and a venetian blind. Make sure the blind is open enough to allow fan recirculation into the room.
4. Use the fan speed control to adjust the room temperature. The slower the air flow, the higher the outlet temperature, because of the increased air retention time in the heater. Rooms and home areas usually are planned for 1 to 2 air changes every three hours. Turn the knob clockwise to increase the air flow.
5. The fan capacity is 75 cubic feet of air per minute. Divide this into the volume of the room or heated area and this will show the number of air changes per hour.
6. For example:
   Air changes = Room 20ft x 15ft x 10 ft high = 3000 cubic feet volume.

   Air Changes= $\frac{\text{3000 cubic ft}}{\text{75 cu ft/min x 60 min/hr}}$ = .66 air changes per hour (~2 air changes every 3 hours)

7. Cloudy, low sunlight, or rain conditions may not produce enough Photovoltaic Panel energy on the front of the heater to operate the fan, even though there may be enough solar energy for the heater to add 3-4 degrees to the room temperature. Use the AC adapter to operate the fan from household power. (a timer can schedule the fan for day use only). The cost is minimal.
8. For cottages and homes without power, an optional large PV panel will be available for increased sensitivity for low sunlight conditions.
9. **WHAT IS YOUR PAYBACK:** We use a NASA/Government program that calculates the energy savings and heating output in most locations in the world. Email your location, home area, electricity cost per kWh, heating fuel and unit cost, and we will send you the time payback estimate on the savings in energy by using an air solar heater or fill in form at www.solarinfrasystems.com

SIS Model C25M 1848 SPECIFICATIONS

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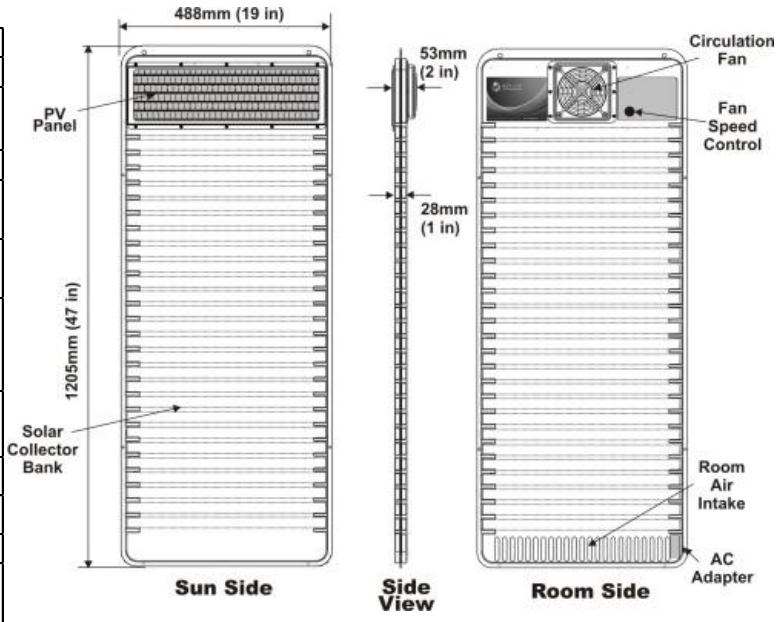
	US	Metric
Peak Efficiency Ave	80%	80%
Ave Max Daily Power Output [1]	736 btu/hr/sqft	2.32 kWhr/m2
Window Mounting	Single Glaze	Single Glaze
Heater Mounting Tilt in Window	Vertical (90°)	Vertical (90°)
Azimuth (Direction facing Sun)	0° (Due South)	0° (Due South)
Ave Total Annual Solar Radiation [2] - Tilted (90°) 12 mon	3.7mbtu/sqft	1,090 kWh/m2
Total Annual Heating Delivered (9 mon)	4.1 mbtu	1201 kWhr
Air Flow Range	10-75 cfm	17-127 m3/hr
Max Air Pressure	.093inH2O	2.37mmH2O
Noise Level	32.95db	32.95db
Ave Temperature Increase[3] Sept-May	44.8 °F	24.9°C
Max Air Temperature Increase	110°F	45°C
Solar Collector Infra Red Absorption	95%	95%
Solar InfraRed Transmission Polycarbonate Panel	90%	90%
Number of Staged Solar Collectors	26	26
Staged Collector Projected Area	45.64sqft	4.24m2
PV Panel	7W 14vdc	7W 14vdc
AC Adapter	AC 110/220vac-12 vdc 500ma	
Collector Material	aluminum/steel	aluminum/steel
Plastic Panel[4] Materials	UL94v-0	UL94v-0
Heater Weight	15lbs	6.8 kg

1. Based on 80% of solar radiation on 90 tilted heater (vertical) behind single glaze window at 49 N lattitude. 9 months of year (Sept to May)
2. RETScreen data (NRCan/CanmetENERGY) (NASA solar data)
3. Retscreen 49 N latitude -123.1 E longitude.
4. Underwriter's Laboratories -self extinguishing. Conforms to window and wall covering building stds.

Specifications subject to change without notice.

Dimensions



Controls

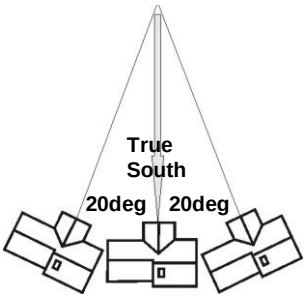
Turn the Fan Speed Control knob clockwise to increase the fan circulation. Start out with this setting until you find the room temperature comfortable.

Turn off the fan when you do not want the heater to operate.

Turn Fan Control Knob to maximum

An AC adapter is supplied to operate the fan when cloudy or low sunlight conditions are not enough for the PV panel to operate the fan. Plug in the AC adapter into the heater and adjust the fan speed.

Sun Orientation



South (or North in the southern hemisphere) facing covers 20 degrees on both sides of a true south. More east catches morning solar and west catches afternoon solar.

Watch for roof eves that overhang and shade the window and heater as well as trees and buildings that block the sun's path.

Don't forget to fill out the Warranty Card and the Solar Energy Payback Estimator

WARRANTY TERMS

If a defect arising solely from faulty hardware, materials or workmanship appears under proper use of this equipment:
For defects in hardware, materials and workmanship, within a period of 12 months from the date of purchase, Solar Infra Systems will repair the defect, or at its option, replace the defective part or parts.

The main exclusions from the warranty are if the equipment has been:

1. Neglected, mishandled or inappropriately used; or
2. Modified or altered in any way except with the prior approval of Solar Infra Systems.

Solar Infra Systems is not liable for any consequential loss.

1 Solar Infra Systems is not liable to the Buyer for any defect unless the Buyer immediately gives Solar Infra Systems notice in writing or email of the alleged defect with full particulars of the operating conditions under which it became apparent and returns this equipment, or relevant part, shipping paid to Solar Infra Systems.

2 Any items returned to Solar Infra Systems are at Buyer's risk. Repaired or replacement items will be despatched shipping paid to the address requested by Buyer.

3 Solar Infra Systems total liability relating to the supply of this equipment is limited to the Buyer's purchase price of the product .

The warranty is given to the Buyer of this equipment from Solar Infra Systems or Solar Infra Systems subsidiaries.
The warranty cannot be transferred by the Buyer to any other person or company.

Contact: email:info@solarinfrasystems.com Tel: Toll Free 1-855-535-2056.

SOLAR PAYBACK ESTIMATOR: See What Air Solar Heating Can Do!

Please fill out this form and we will run a RETScreen analysis for you to show the air solar heating and the cost savings estimate. (Mail, fax, or email)

	Name			
	Email			
	Telephone			
1	Location: Country, state, prov, etc			
2	Nearest large City			
3	Heating Period (example Oct to May)		please check	
4	Your average inside temperature		degF	degC
5	Do you have a South facing wall, roof, or direction ?? To sun path.			
6	Shading from trees, buildings, in season		% estimated	
7	**Home, Apartment, Building**			
a	Approximate area		sqft	sqM
b	Number of floors			
c	Basement insulated or not			
d	Window glaze on south facing side			
	Single glaze			
	Double glaze			
	Other			
e	R-value for roof and walls			
f	Approx age of building			
8	**Electricity and Heating System**			
a	Cost of electricity per kilowatt hour			
b	Heating fuel (gas, oil, propane,etc)			
c	Cost per unit of heating fuel (gal, therm, GJ, liter, cuM, etc)			
e	Age of furnace			
f	Last serviced			
g	Heating system efficiency			
h	Have you had an energy audit?			
i	Send me RETScreen File (requires Microsoft Office Excel)			

We use RETScreen to analyze an air solar heating unit or system for your application. The program was developed by Natural Resources Canada, using NASA solar data. The program is used world-wide since the 1990's and has solar data for most world locations. The program is a free download at www.retscreen.net. (You need Microsoft Office Excel to use the program). We normally send you a PDF file of the results of the analysis, but we can also send a RETSCreen file to run more comparisons.

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IMPORTANT
The SIS Consumer Model is designed for interior use, inside a single pane south-facing window, and not for outdoor applications.

Double pane, Low-E, Triple Pane, all reduce the amount of solar heat that enters the window. The efficiency of the interior air solar heater will decrease, compared the single pane windows.

The SIS Consumer Solar Air Heater, mounted inside the room, behind the window glass, reverses this heat loss, collects the solar heat coming through the glass, and heats the air in the room.

Window Construction		Radiative Heat Loss (Btu/hr/ft2)	Conductive Heat Loss (Btu/hr/ft2)	Total Heat Loss (Btu/hr/ft2)	Compared to Single Pane Heat Loss Reduction	Indoor Glass Temp(°F)
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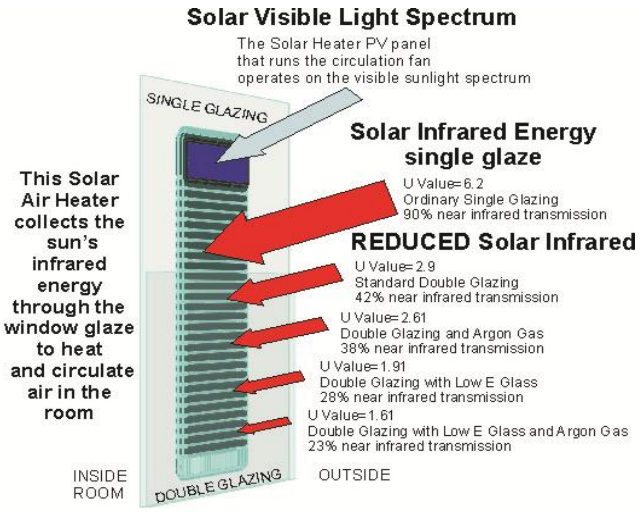
Solar Visible Light Spectrum
The Solar Heater PV panel that runs the circulation fan operates on the visible sunlight spectrum
SINGLE GLAZING
Solar Infrared Energy single glaze
U Value=6.2
Ordinary Single Glazing
90% near infrared transmission
REDUCED Solar Infrared
U Value=2.9
Standard Double Glazing
42% near infrared transmission
U Value=2.61
Double Glazing and Argon Gas
38% near infrared transmission
U Value=1.91
Double Glazing with Low E Glass
28% near infrared transmission
U Value=1.61
Double Glazing with Low E Glass and Argon Gas
23% near infrared transmission
This Solar Air Heater collects the sun's infrared energy through the window glaze to heat and circulate air in the room
INSIDE ROOM
DOUBLE GLAZING
OUTSIDE

Construction type	U-value		R-value	
	W/m^2•K	BTU/(h °F ft²)	m^2•K/W	h °F ft²/BTU
Single pane	4.8	0.85	0.21	1.2
Double pane, air filled	2.8	0.49	0.36	2.0
Double pane, low-E	2.1	0.37	0.48	2.7
Double pane, low-E, Argon filled	1.9	0.33	0.53	3.0
Triple pane	2.1	0.37	0.48	2.7
Triple pane, low-E, Argon filled	1.4	0.25	0.71	4.1
Quadruple pane, very low-E, Krypton filled	0.74	0.13	1.35	7.7
Quintuple pane, very low-E, Xenon filled	0.51	0.09	1.96	11.1

In house windows, the U factor is the rate of heat loss, through the glass of the window, from inside the house to the outside. The heat loss rate depends on the difference between the temperature inside the room and outside the house. Double glazing, Low E, some tints, reduce the heat loss through the window.
The SIS Solar Air Heater, mounted inside the room, behind the window glass, reverses this heat loss, collects the solar heat coming through the glass, and heats the air in the room. Ordinary single glazing works best with a Solar Air Heater.

Thank you for purchasing a Solar Infra Heater

Detailed information and a hanging kit is found in the instruction package

Please note that this package also contains an A/C to D/C adapter.

Please remove all plastic wrap before activating the unit in the sun

The unit must be placed on the inside of a south exposed window

This unit is not designed for exterior or outdoor installations. Other models with waterproof fans are available

Efficiency ratings have been measured from behind single pane windows. The efficiency will decrease when behind thermo pane or "E" glass that reduces infra red energy transmission. Solar infra can tell you the length of time it will take for this unit to pay back the purchase price in energy savings based on the season, your location and local energy costs. Please email us at info@solarinfrasystems.com or call toll-free at 1 855 535 2056

The heater may be simply placed on the windowsill leaning against the glass or suspended from the window header with the supplied mounting kit. The discharge fan must face the interior of the room

Please retain the original shipping carton for a period in case of any issues you may have with our product and contact us directly.

info@solarinfrasystems.com

Toll free @1 855 535 2056

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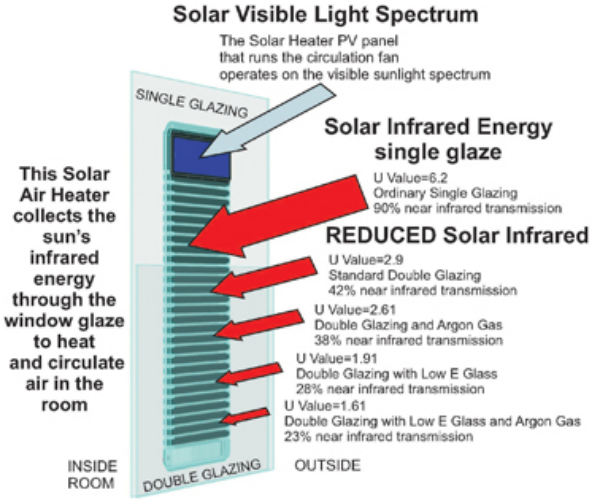
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